

Deliwala 500301D5

IN THE CLAIMS:

Please amend the pending claims as follows:

1. - 11. *cancelled*

12. (*currently amended*) An optical device formed at least partially in a Silicon-On-Insulator (SOI) wafer comprising a substrate, an insulator layer disposed over said substrate and an upper silicon layer disposed over said insulator layer, the optical device comprising

an upper silicon layer formed on the SOI wafer, the upper silicon layer at least partially forming a waveguide formed in a portion of the upper silicon layer; and

a waveguide mirror formed in the upper silicon layer, wherein the waveguide mirror is formed at least in part by etching the upper silicon layer of the SOI wafer.

13. (*previously added*) The optical device of claim 12, wherein the optical device includes an input/output light coupler, the optical waveguide including a cladding, and the input/output light coupler including an evanescent coupling region that is at least partially formed from the same material as the cladding.

14. (*previously added*) The optical device of claim 13, wherein the evanescent coupling region and the cladding portion are at least partially formed of glass.

15. (*previously added*) The optical device of claim 13, wherein the evanescent coupling region and the cladding portion are at least partially formed of a polyamide.

16. (*previously added*) The optical device of claim 15, wherein the optical device includes a hybrid active electronic and optical circuit, wherein an electric insulator is also used to partially define an active electronic circuit in a hybrid active electronic and optical circuit.

17. (*previously added*) The optical device of claim 12, wherein altering an electric voltage applied to an active electronic circuit on the wafer affects a free carrier distribution associated with the optical device, and thereby changes the effective mode index of the optical device.

18. (*previously added*) The optical device of claim 12, further comprising an active electronics portion that is located proximate a channel portion, in which electricity can be selectively applied to a region outside of the channel region to control the

Deliwala 500301D5

electromagnetic state of the channel portion in a manner that can effect light traversing the channel portion.

19. *(previously added)* The optical device of claim 18, wherein the active electronics portion combines with the channel portion to act as one from the group of a modulator, a deflector, a diode, and a transistor.

20. *(previously added)* The optical device of claim 19, further comprising a passive optical portion, wherein the passive optical portion and the active electronics portion are fabricated simultaneously to form a hybrid active electronic and optical circuit at least partially in the upper silicon layer.

21. *(previously added)* The optical device of claim 12, wherein the waveguide mirror is configured to provide total internal reflection.

22. *(previously added)* The optical device of claim 12, wherein the waveguide mirror is configured as an off-axis paraboloid.

23. *(previously added)* The optical device of claim 12, wherein the waveguide mirror is configured as a beamsplitter to separate a single incident beam into a plurality of output beams.

24. *(previously added)* The optical device of claim 12, wherein the optical device includes one from the group of a p-n device, a field plated device, a Schottky device, a MOSCAP, and a MOSFET.

25. *(previously added)* The optical device of claim 12, further comprising a channel formed in the waveguide, wherein the waveguide mirror focuses light into the channel.

26. *(previously added)* The optical device of claim 12, wherein the waveguide mirror is included as a portion of a waveguide Fabry-Perot cavity.

27. *(currently amended)* The optical device of claim 12, wherein the waveguide mirror is included as a portion of an arranged waveguide (AWG).

28. *(previously added)* The optical device of claim 12, wherein material removed to form the waveguide mirror during said etching does not fully extend through the upper silicon layer.

29. *(previously added)* The optical device of claim 12, wherein the upper silicon layer is less than or equal to 10 microns thick.

Deliwala 500301D5

30. (previously added) An optical device formed at least partially in a wafer, the optical device comprising:

an upper silicon layer formed in the wafer, the upper silicon layer atleast partially forming a waveguide; and

a waveguide mirror formed in the upper silicon layer, wherein the waveguide mirror is formed at least in part by etching the upper silicon layer of the waveguide.

31. - 32. cancelled

33. (currently amended) An optical device formed at least partially in a Silicon-On-Insulator (SOI) wafer comprising a substrate, an insulator layer disposed over said substrate and an upper silicon layer disposed over said insulator layer, the optical device comprising:

~~an upper silicon layer formed on the SOI wafer, the upper silicon layer at least partially forming a waveguide~~ formed in a portion of the upper silicon layer; and

a glass layer formed across at least part of the upper silicon layer;

a waveguide mirror ~~functioning disposed~~ in the upper silicon layer and formed at least in part by etching the glass layer.

34. (currently amended) An optical device formed at least partially in a wafer, the optical device, comprising:

an upper silicon layer formed on the wafer, the upper silicon layer at least partially forming a waveguide;

a glass layer formed across at least part of the upper silicon layer; and

a waveguide mirror ~~functioning disposed~~ in the upper silicon layer and formed at least in part by etching the glass layer.

35. - 36. cancelled

37. (currently amended) An optical device formed at least partially in a Silicon-On-Insulator (SOI) wafer comprising a substrate, an insulator layer disposed over said substrate and an upper silicon layer disposed over said insulator layer, the optical device comprising:

~~an upper silicon layer formed on the SOI wafer, the upper silicon layer at least partially forming a waveguide~~ formed in a portion of the upper silicon layer; and

Deliwala 500301D5

a waveguide lens formed in the upper silicon layer, wherein the waveguide lens is formed at least in part by etching the upper silicon layer of the SOI wafer.

38. *(previously added)* The optical device of claim 37, wherein the optical device includes an input/output light coupler, the optical waveguide including a cladding, and the input/output light coupler including an evanescent coupling region that is at least partially formed from the same material as the cladding.

39. *(previously added)* The optical device of claim 38, wherein the evanescent coupling region and the cladding portion are at least partially formed of a glass.

40. *(previously added)* The optical device of claim 38, wherein the evanescent coupling region and the cladding portion are at least partially formed of a polyamide.

41. *(previously added)* The optical device of claim 40, wherein the optical device includes a hybrid active electronic and optical circuit, wherein an electric insulator is also used to partially define an active electronic circuit in a hybrid electronic and optical circuit.

42. *(previously added)* The optical device of claim 37, wherein altering an electric voltage applied to an active electronic circuit on the wafer affects a free carrier distribution associated with the optical device, and thereby changes the effective mode index of the optical device.

43. *(previously added)* The optical device of claim 37, further comprising an active electronics portion that is located proximate a channel portion, in which electricity can be selectively applied to a region outside of the channel portion to control the electromagnetic state of the channel portion in a manner that can effect light traversing the channel portion.

44. *(previously added)* The optical device of claim 43, wherein the active electronics portion combines with the channel portion to act as one from the group of a modulator, a deflector, a diode, and a transistor.

45. *(previously added)* The optical device of claim 44, further comprising a passive optical portion, wherein the passive optical portion and the active electronics portion are fabricated simultaneously to form a hybrid active electronic and optical circuit at least partially in the upper silicon layer.

Deliwala 500301D5

46. *(previously added)* The optical device of claim 37, wherein the waveguide lens is configured to provide total internal reflection.

47. *(previously added)* The optical device of claim 37, wherein the waveguide lens is configured as a beamsplitter to separate a single incident beam into a plurality of output beams.

48. *(previously added)* The optical device of claim 37, wherein the optical device includes one from the group of a p-n device, a field plated device, a Schottky device, a MOSCAP, and a MOSFET.

49. *(previously added)* The optical device of claim 37, further comprising a channel formed in the waveguide, wherein the waveguide lens focuses light into the channel.

50. *(previously added)* The optical device of claim 37, wherein material removed to form the waveguide lens during said etching does not fully extend through the upper silicon layer.

51. *(previously added)* The optical device of claim 37, wherein the upper silicon layer is less than or equal to 10 microns thick.

52. *(previously added)* An optical device formed at least partially in a wafer, the optical device comprising:

an upper silicon layer formed on the wafer, the upper silicon layer at least partially forming a waveguide; and

a waveguide lens formed in the upper silicon layer, wherein the waveguide lens is formed at least in part by etching the upper silicon layer of the wafer.

53. - 54. *cancelled*

55. *(currently amended)* An optical device formed at least partially in a Silicon-On-Insulator (SOI) wafer comprising a substrate, an insulator layer disposed over said substrate and an upper silicon layer disposed over said insulator layer, the optical device comprising

~~an upper silicon layer formed on the SOI wafer, the upper silicon layer at least partially forming a waveguide~~ formed in a portion of the upper silicon layer;

a glass layer formed across at least part of the upper silicon layer; and

Deliwala 500301D5

a waveguide lens functioning in the upper silicon layer formed at least in part by etching the glass layer.

**56. (previously added)** An optical device formed at least partially in a wafer, the optical device comprising:

an upper silicon layer formed on the wafer, the upper silicon layer at least partially forming a waveguide;

a glass layer formed across at least part of the upper silicon layer; and

a waveguide lens functioning in the upper silicon layer formed at least in part by etching the glass layer.

**57. - 58. cancelled**